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Kine

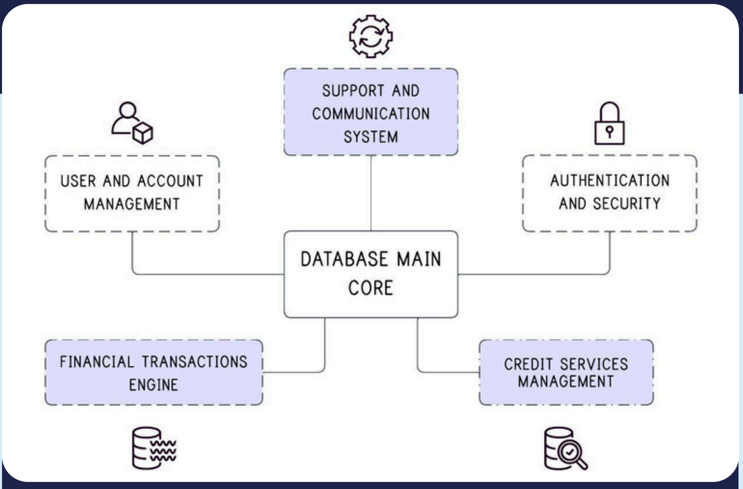
Kine: database system design inspired by nequi

Introduction

Kine is a 100% digital financial system inspired by Nequi, the mobile-first platform developed by Bancolombia. It replicates the user-centric banking experience focused on simplicity, accessibility, and seamless integration with essential financial services. Kine's innovation lies in eliminating the need for physical branches and enabling instant, secure transactions. This project focuses on replicating Nequi's database architecture by designing an efficient, secure, and scalable backend to support digital financial operations at high concurrency.

Research Objectives

- How can we design and replicate a robust, secure, and scalable database system inspired by Nequi, capable of supporting real-time financial operations and user services?
- A normalized, secure, and extendable hybrid database model combining a relational PostgreSQL core for critical financial operations—such as digital account management, transactions, and credit services—with a flexible MongoDB layer to handle unstructured support data, historical records, and future scalability needs.



SUPPORT AND COMMUNICATION SYSTEM
USER AND ACCOUNT MANAGEMENT
AUTHENTICATION AND SECURITY
DATABASE MAIN CORE
FINANCIAL TRANSACTIONS ENGINE
CREDIT SERVICES MANAGEMENT

Proposed Solution

The proposed system is based on a modular architecture that separates key business concerns into five major components.

1. User and Account Management

Handles registration, profile data, device linking, and digital account creation.

2. Financial Transactions Engine

Central to the system, this component manages all types of money flow.

3. Credit Services Management

Supports credit applications, interest calculations, due dates, and disbursement.

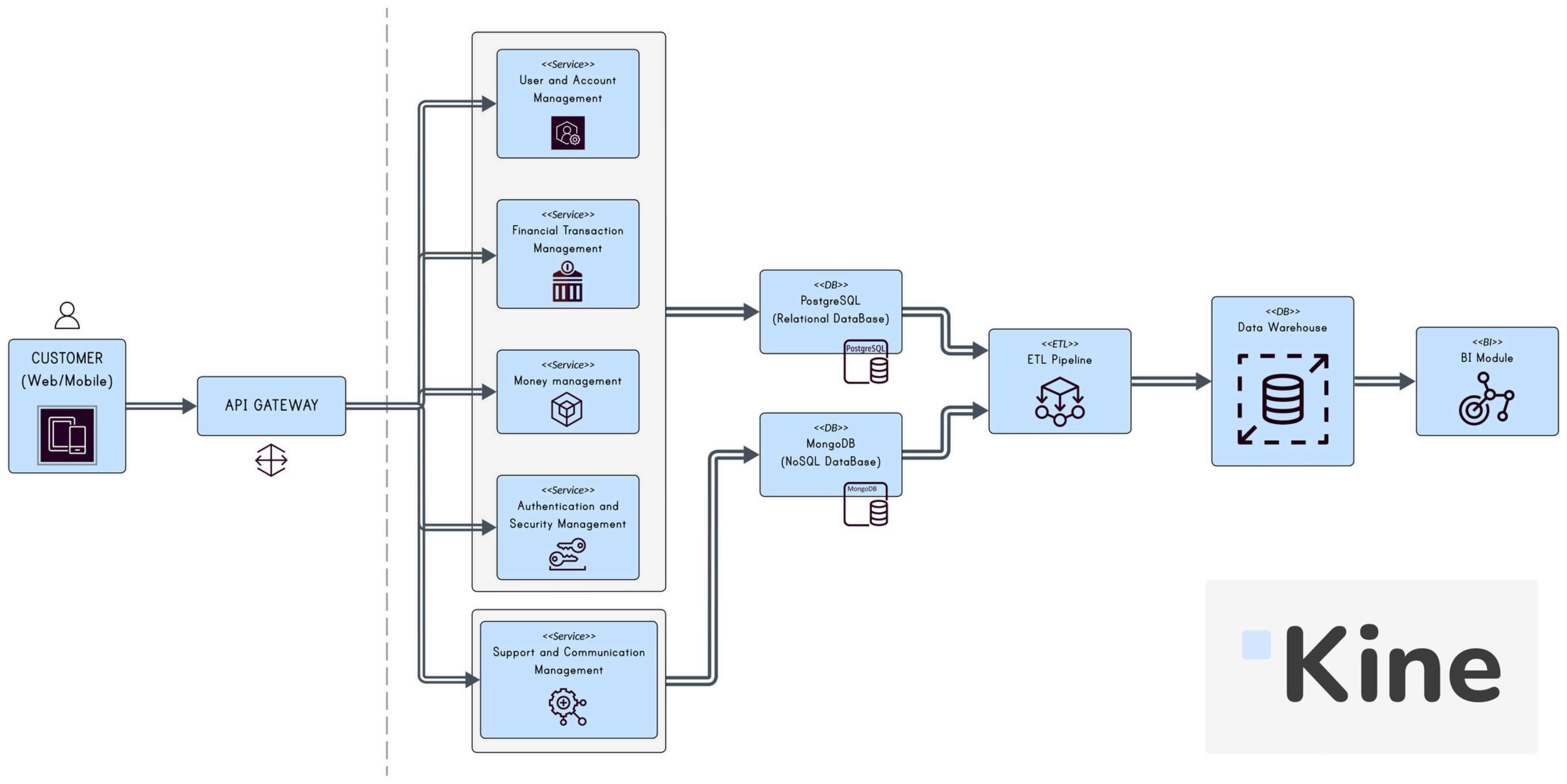
4. Authentication and Security

Implements multi-layered security mechanisms such as hashed PINs and device control.

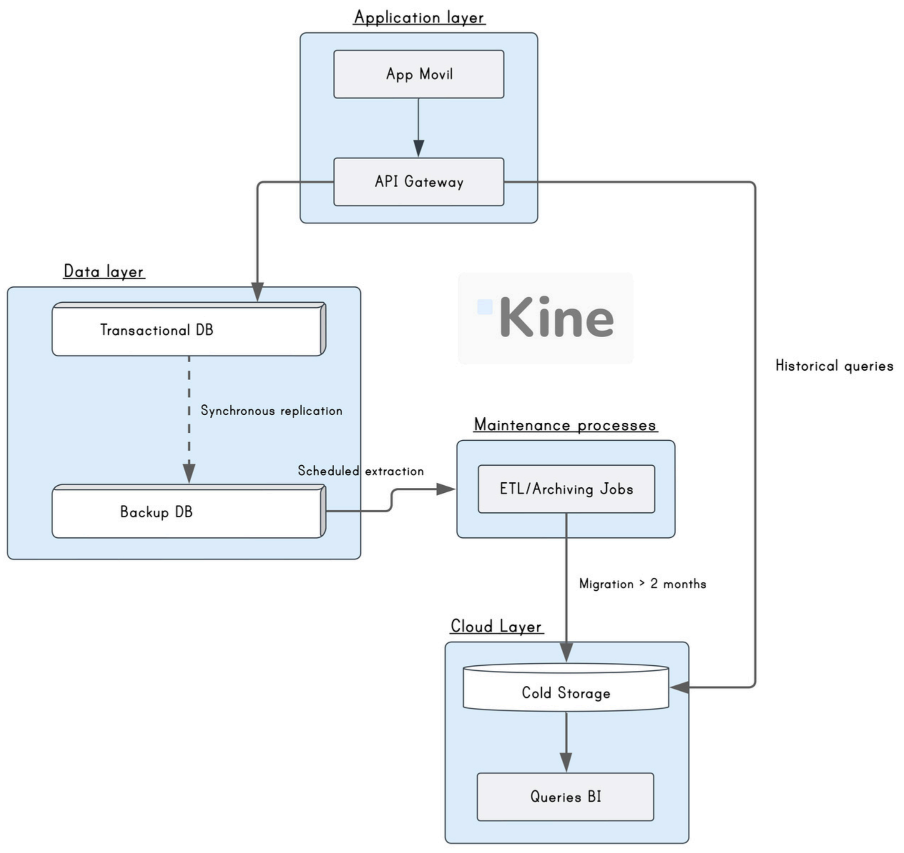
5. Support and Communication System

Allows users to create and track support tickets (queries, reports, feedback).

Result & Design process



CUSTOMER (Web/Mobile)
API GATEWAY
<<Service>> User and Account Management
<<Service>> Financial Transaction Management
<<Service>> Money management
<<Service>> Authentication and Security Management
<<Service>> Support and Communication Management
<<DB>> PostgreSQL (Relational DataBase)
PostgreSQL
<<DB>> MongoDB (NoSQL DataBase)
MongoDB
<<ETL>> ETL Pipeline
<<DB>> Data Warehouse
<<BI>> BI Module
Kine



Data Architecture and Distributed Design

Kine integrates PostgreSQL for core transactions and MongoDB Atlas for semi-structured support data, using a modular entity-relationship model with triggers for business rules. Instead of parallel processing, a distributed design was chosen: active data remains in PostgreSQL for OLTP performance, while older records are offloaded to cloud storage. This hybrid approach ensures consistency, scalability, and regulatory compliance in a digital banking context.

Conclusion

- The database design captures core financial operations through a modular and hybrid schema. PostgreSQL ensures transactional integrity with normalized structures and foreign keys, while MongoDB supports non-relational and historical data, enabling scalability without sacrificing consistency.

References

- Nequi, "https://www.nequi.com.co", Accessed May 2025.
- MongoDB Inc., MongoDB vs. Relational Databases, MongoDB Documentation, 2023. [En línea]. Disponible: https://www.mongodb.com/compare/mongodb-vs-relational-databases

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